What is claimed is:

1. A method for controlling a fuel flow to an engine of an aircraft, comprising:

comparing an acceleration condition of the aircraft with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable;

comparing the acceleration condition with a time-based acceleration profile for a given flight profile;

determining ~~whether~~ the aircraft is about to enter a prolonged negative acceleration regime;

maintaining normal fuel control; and

after a predetermined amount of time has passed, initiating an alternate fuel source to the engine.

2. The method of Claim 1, further comprising determining an acceleration condition of the aircraft.

3. The method of Claim 2, wherein said determining an acceleration condition of the aircraft includes determining ~~an~~ the acceleration condition using an inertial measurement unit.

4. The method of Claim 1, wherein said comparing the acceleration condition with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable includes comparing the acceleration condition with a predetermined threshold of approximately 0.2 *g*.

5. The method of Claim 1, wherein said comparing the acceleration condition with a time-based acceleration profile for a given flight profile includes comparing the acceleration condition with a time-based acceleration profile extracted from a pre-existing database of IMU acceleration data.

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6. The method of Claim 1, wherein after a predetermined amount of time has passed, initiating an alternate fuel source to the engine includes determining whether a counting period has exceeded an amount of time corresponding to a maximum amount of sump fuel volume to be used.

7. The method of Claim 1, wherein initiating an alternate fuel source to the engine includes initiating an accumulator to the engine.

8. The method of Claim 1, wherein initiating an alternate fuel source to the engine includes energizing an accumulator regulator.

9. The method of Claim 1, wherein maintaining normal fuel control includes maintaining normal fuel control using a sump.

10. A method for controlling a fuel flow to an engine of an aircraft, comprising:

controlling fuel flow in a normal manner;

determining an acceleration condition of the aircraft;

comparing the acceleration condition with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable;

comparing the acceleration condition with a time-based acceleration profile for a given flight profile;

determining ~~whether~~ the aircraft is about to enter a prolonged negative acceleration regime;

initiating a counting period while maintaining normal fuel control;

determining whether the counting period has exceeded a predetermined amount of time; and

when the predetermined amount of time has passed, initiating an alternate fuel source to the engine.

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paid

11. The method of Claim 10, wherein comparing the acceleration condition with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable includes comparing the acceleration condition with a predetermined threshold of approximately 0.2 *g*.

paid

12. The method of Claim 10, wherein comparing the acceleration condition with a time-based acceleration profile for a given flight profile includes comparing the acceleration condition with a time-based acceleration profile extracted from a pre-existing database of IMU acceleration data.

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13. The method of Claim 10, wherein determining whether the counting period has exceeded a predetermined amount of time includes determining whether the counting period has exceeded an amount of time corresponding to a maximum amount of sump fuel volume to be used.

paid

14. The method of Claim 10, wherein initiating an alternate fuel source to the engine includes initiating an accumulator to the engine.

paid

15. The method of Claim 10, wherein initiating an alternate fuel source to the engine includes energizing an accumulator regulator.

16. A fuel system for delivering a fuel flow to an engine, comprising:

a tank member having an interior region adapted to contain a quantity of fuel;

a pump fluidly coupled to the interior region and adapted to provide a flow of fuel from the tank member through a feed conduit to the engine;

a sump disposed within the interior region and adapted to provide a first quantity of fuel to the engine via the pump;

a secondary fuel storage device operatively coupled to the feed conduit and adapted to provide a second quantity of fuel to the engine;

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a pressurized vessel operatively coupled to the tank member and to the secondary fuel storage device and adapted to pressurize each of the tank member and the secondary fuel storage device; and

a control unit operatively coupled to the secondary fuel storage device and to at least one of the pump and the sump, the control unit being adapted to receive input signals from an acceleration measurement device indicative of an acceleration condition of the aircraft, and to output control signals to the secondary fuel storage device and to at least one of the pump and the sump, the control unit further being adapted to perform a method of controlling fuel flow, including:

comparing the acceleration condition of the aircraft with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable;

comparing the acceleration condition with a time-based acceleration profile for a given flight profile;

determining ~~whether~~ the aircraft is about to enter a prolonged negative acceleration regime;

maintaining a first fuel flow to the engine from the sump using the pump; and

after a predetermined amount of time has passed, initiating a secondary fuel flow from the secondary fuel storage device to the engine.

17. The fuel system of Claim 16, wherein ~~determining an~~ the acceleration condition of the aircraft is determined ~~includes determining an acceleration condition~~ using an inertial measurement unit.

18. The fuel system of Claim 16, wherein paid comparing the acceleration condition with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable includes comparing the acceleration condition with a predetermined threshold of approximately 0.2 *g*.

19. The fuel system of Claim 16, wherein paid comparing the acceleration condition with a time-based acceleration profile for a given flight profile includes comparing the

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acceleration condition with a time-based acceleration profile extracted from a pre-existing database of IMU acceleration data.

20. The fuel system of Claim 16, wherein said step of after a predetermined amount of time has passed, initiating the secondary fuel storage device to the engine includes determining whether a counting period has exceeded an amount of time corresponding to a maximum amount of sump fuel volume to be used.

21. The fuel system of Claim 16, wherein said initiating the secondary fuel storage device to the engine includes initiating an accumulator to the engine.

22. The fuel system of Claim 16, wherein said initiating the secondary fuel storage device to the engine includes energizing an accumulator regulator.

23. The fuel system of Claim 16, wherein said maintaining normal fuel control includes maintaining said normal fuel control using a sump.

24. An aerospace vehicle, comprising:

a fuselage;

one or more lifting surfaces operatively coupled to the fuselage;

at least one engine operatively coupled to the fuselage; and

a fuel system operatively at least partially disposed within the fuselage and operatively coupled to the at least one engine, the fuel system including

a tank member having an interior region adapted to contain a quantity of fuel;

a pump fluidly coupled to the interior region and adapted to provide a flow of fuel from the tank member through a feed conduit to the engine;

a sump disposed within the interior region and adapted to provide a first quantity of fuel to the engine via the pump;

a secondary fuel storage device operatively coupled to the feed conduit and adapted to provide a second quantity of fuel to the engine;

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a pressurized vessel operatively coupled to the tank member and to the secondary fuel storage device and adapted to pressurize each of the tank member and the secondary fuel storage device; and

a control unit operatively coupled to the secondary fuel storage device and to at least one of the pump and the sump, the control unit being adapted to receive input signals from an acceleration measurement device indicative of an acceleration condition of the aircraft, and to output control signals to the secondary fuel storage device and to at least one of the pump and the sump, the control unit further being adapted to perform a method of controlling fuel flow, including:

comparing the acceleration condition of the aircraft with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable;

comparing the acceleration condition with a time-based acceleration profile for a given flight profile;

determining ~~whether~~ the aircraft is about to enter a prolonged negative acceleration regime;

maintaining a first fuel flow to the engine from the sump using the pump; and

after a predetermined amount of time has passed, initiating a secondary fuel flow from the secondary fuel storage device to the engine.

25. The aerospace vehicle of Claim 24, wherein ~~determining an~~ the acceleration condition of the aircraft is determined ~~includes determining an acceleration condition~~ using an inertial measurement unit.

26. The aerospace vehicle of Claim 24, wherein paid comparing the acceleration condition with a predetermined threshold at which normal fuel fluid characteristics begin to become unpredictable includes comparing the acceleration condition with a predetermined threshold of approximately 0.2 *g*.

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27. The aerospace vehicle of Claim 24, wherein, comparing the acceleration condition with a time-based acceleration profile for a given flight profile includes comparing the acceleration condition with a time-based acceleration profile extracted from a pre-existing database of IMU acceleration data.

28. The aerospace vehicle of Claim 24, wherein, after a predetermined amount of time has passed, initiating the secondary fuel storage device to the engine includes determining whether a counting period has exceeded an amount of time corresponding to a maximum amount of sump fuel volume to be used.

29. The aerospace vehicle of Claim 24, wherein, initiating the secondary fuel storage device to the engine includes initiating an accumulator to the engine.

30. The aerospace vehicle of Claim 24, wherein, initiating the secondary fuel storage device to the engine includes energizing an accumulator regulator.

31. The aerospace vehicle of Claim 24, wherein, maintaining normal fuel control includes maintaining, normal fuel control using a sump.

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